

# PATENT ABSTRACTS OF JAPAN

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(21)Application number : 2002-321482 (71)Applicant : NSK LTD

(22)Date of filing : 05.11.2002 (72)Inventor : YAMAMOTO HISASHI

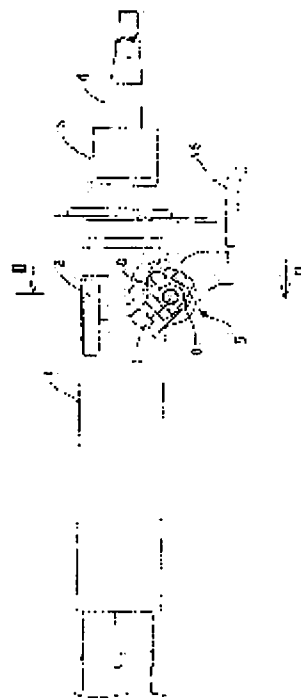
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## (54) TELESCOPIC STEERING COLUMN DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To prevent a piece member from galling to an inner column at a telescoping operation by stopping the rotation of the piece member and to stabilize the pressing power (holding power) by increasing the surface pressed by the piece member toward the inner column.

SOLUTION: A lock housing portion 5 is formed on an outer column 3 through which an inner column 3 is slidably inserted, and a pair of piece members 7 and 8 are fitted slidably into a cylinder hole 6 formed within the lock housing portion 5. There is formed a lock mechanism where the inner column 3 is pressed by making the pair of the piece members 7 and 8 closer to each other while the press toward the inner column 3 is released by separating the members 7 and 8 from each other, in accordance with a swing movement of an operation lever 15 by the operator. The cylinder hole 6 in the lock housing portion 5 has a triangle cross section (non-circular) and each of the pair of the members 7 and 8 also has a triangle (non-circular) cross section.



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the examiner's decision of rejection or  
application converted registration]

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[Patent number]

[Date of registration]

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against examiner's  
decision of rejection]

[Date of extinction of right]

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CLAIMS

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[Claim(s)]

[Claim 1]

Fit in the piece member of a pair in the cylinder hole which formed the lock housing section in the outer column which \*\*\*\*(ed) the inner column free [ sliding ], and was formed in it at the lock housing circles concerned, enabling free sliding, and it corresponds to rocking of a control lever. In flexible type steering column equipment equipped with the lock device in which make the piece member of said pair estrange mutually, and the press to said inner column is canceled while bringing the piece member of said pair mutually close and pressing said inner column,

The cylinder hole of said lock housing section is flexible type steering column equipment with which the piece member of said pair is also characterized by having formed the cross section in a non-round shape corresponding to this while having formed the cross section in the non-round shape.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention expands and contracts the overall length of the steering column which \*\*\*\*(ed) the steering shaft according to an operator's physique and operation posture, and relates to the flexible type steering column equipment which adjusts the car cross-direction location of a steering wheel.

[0002]

[Description of the Prior Art]

According to an operator's physique and operation posture, the overall length of the steering column which \*\*\*\*(ed) the steering shaft is expanded and contracted, and there is flexible type steering column equipment (the so-called telescopic steering column equipment) which adjusts the car cross-direction location of a steering wheel in the steering system for cars.

[0003]

By the patent reference 1, it has fitted in free [ sliding of the piece member of a pair ] in the cylinder hole which formed the lock housing section in the outer column which \*\*\*\*(ed) the inner column free [ sliding ], and was formed in it at these lock housing circles. While bringing the piece member of these pairs mutually close and pressing an inner column corresponding to rocking of the control lever by the operator, it has the lock device in which make the piece member of a pair estrange mutually and the press to an inner column is canceled.

[0004]

Corresponding to this, that cross section is circularly formed in drawing 4 for the piece member c of the pair to which that cross section fitted into this cylinder hole b free [ sliding ] while the side face of the lock housing section of the flexible type steering column equipment concerning this patent reference 1 is shown and having formed circularly the cylinder hole b formed in the lock housing section a in the case of the patent reference 1.

[0005]

[Patent reference 1]

JP,6-78155,U (utility model registration No. 2588338)

[0006]

[Problem(s) to be Solved by the Invention]

However, in the case of the patent reference 1, at the time of rocking of a control lever, since the cross section of the piece member c of a pair is also circularly formed while having formed circularly the cross section of the cylinder hole b of the lock housing section a, when torque starts the piece member c of a pair, the piece member c of a pair may rotate, respectively.

[0007]

Consequently, if the piece member c is rotating at the time of rocking of a control lever, at the time of telescopic actuation, it will have been said that the piece member c holds on to an inner column.

[0008]

Moreover, if the cross section of the cylinder hole b and the piece member c is circular, in the part where the piece member c presses an inner column, a press side (friction surface) will not be stabilized but it will have been said that the thrust (holding power) by frictional force becomes unstable.

[0009]

It increases the press side to the inner column by the piece member, and aims at offering the flexible type steering column equipment aiming at stabilization of thrust (holding power) while this invention is made in view of a situation which was mentioned above, prevents rotation of a piece member certainly and prevents with [ to the inner column of the piece member at the time of telescopic actuation ] galling.

[0010]

[Means for Solving the Problem]

In order to attain the above-mentioned purpose, the flexible type steering column equipment concerning this invention Fit in the piece member of a pair in the cylinder hole which formed the lock housing section in the outer column which \*\*\*\*(ed) the inner column free [ sliding ], and was formed in it at the lock housing circles concerned, enabling free sliding, and it corresponds to rocking of a control lever. In flexible type steering column equipment equipped with the lock device in which make the piece member of said pair estrange mutually, and the press to said inner column is canceled while bringing the piece member of said pair mutually close and pressing said inner column,

While having formed the cross section in the non-round shape, as for the cylinder hole of said lock housing section, the piece member of said pair is also characterized by having formed the cross section in a non-round shape corresponding to this.

[0011]

According to this invention, thus, the cylinder hole of the lock housing section Even if the piece member of a pair also requires torque for the piece member of a pair at the time of rocking of a control lever since the cross section is formed in the non-round shape corresponding to this while having formed the cross section in the non-round shape Rotation of the piece member of a pair can be prevented certainly and it can prevent with [ to the inner column of the piece member at the time of telescopic actuation ] galling.

[0012]

Moreover, a cylinder hole and a piece member can increase the press side (friction surface) to the inner column by the piece member from the cross section being un-circular compared with the case of being circular, therefore can attain stabilization of the thrust (holding power) by frictional force.

[0013]

[Embodiment of the Invention]

Hereafter, the flexible type steering column equipment concerning the gestalt of operation of this invention is explained, referring to a drawing.

[0014]

Drawing 1 is the side elevation of the flexible type steering column equipment concerning the gestalt of operation of this invention. Drawing 2 is the sectional view which met the II-II line of drawing 1 . Drawing 3 (a) is the expansion side elevation of lock housing shown in drawing 1 , and (b) is the expansion side elevation of the lock housing section concerning a modification.

[0015]

As shown in drawing 1 and drawing 2 , the outer column 1 is formed in the shape of [ long to shaft orientations ] tubing with dies casting shaping of aluminum material, or injection molding of synthetic resin. This outer column 1 is supported under the dashboard etc. by the bearing bracket 2 really projected with shaping on those both sides.

[0016]

Inside the outer column 1, the inner column 3 formed in the shape of [ long to shaft orientations ] tubing is inserted in shaft orientations free [ sliding ]. Inside this inner column 3, the elastic steering shaft 4 is supported free [ rotation ].

[0017]

As shown in drawing 2 , the lock housing section 5 is really formed in the lower part of a bearing bracket 2 with shaping. The cylinder hole 6 which penetrates the lock housing section 5 to the cross direction is formed in this lock housing section 5.

[0018]

The 1st piece member 7 is inserted in \*\*\*\*\* (right half part of drawing 2 ) of this cylinder hole 6 free [ sliding ]. 1st inclined plane 7a is formed in the upper part of the central approach of the 1st piece member 7, and this 1st inclined plane 7a presses the peripheral face of the inner column 3.

[0019]

Moreover, the 2nd piece member 8 is inserted in other halves section (left half part of drawing 2 ) which is the cylinder hole 6 free [ sliding ]. 2nd inclined plane 8a is formed above the center of the 2nd piece member 8, and this 2nd inclined plane 8a presses the peripheral face of the inner column 3.

[0020]

In addition, a flat surface is sufficient as the 1st and 2nd inclined planes 7a and 8a, and they may be the curved-surface configurations corresponding to the peripheral face of the inner column 3.

[0021]

Next, the lock device of these 1st and 2nd piece members 7 and 8 is constituted as follows. The screw hole 9 of a female screw is formed in the 1st piece member 7. The through tube 10 is formed in the screw hole 9 and this alignment at the 2nd piece member 8. The screw lever 11 is inserted in the screw hole 9 of the 1st piece member 7, and the through tube 10 of the 2nd piece member 9.

[0022]

The screw lever 11 has reverse screw section 11b of a reverse male screw in the other end side while having screw section 11a of the male screw screwed in an end side at a screw hole 9. In addition, this reverse screw section 11b is taken as screws with a coarse pitch, such as the Nijo screw.

[0023]

In addition, the locknut 12 is screwed in the part projected from the outer edge surface of the 1st piece member 7 by the end side of the screw lever 11. This locknut 12 is bound to the outer edge surface of the 1st piece member 7, and is maintaining the screw lever 11 to nonrotation. In addition, one pair of parallel flat sides 13 are mutually formed in the end section peripheral face of the screw lever 11.

[0024]

The adjusting nut 14 is screwed in reverse screw section 11b projected from the outer edge surface of the 2nd piece member 8 by the other end side of the screw lever 11. Joint immobilization of the end face section of a control lever 15 has been carried out by welding etc. at this adjusting nut 14.

[0025]

Furthermore, the compression spring 16 is pinched between the 1st and 2nd piece member 7 and eight comrades. Both the piece member 7 and eight comrades are made to estrange certainly according to the energization force of this compression spring 16 at the time of telescopic adjustment. In addition, a compression spring 16 is not [ that what is necessary is just to prepare if needed ] necessarily indispensable.

[0026]

Thus, with the constituted flexible type steering column equipment, if a control lever 15 is rocked to an one direction and an adjusting nut 14 is rotated to an one direction at the time of with a telescopic bundle, since the adjusting nut 14 is screwed in reverse screw section 11b of the screw lever 11 of nonrotation, while the tensile force to the left of drawing 2 acts on the screw lever 11 of nonrotation, the reaction force to the method of the right of drawing 2 will act on an adjusting nut 14 according to an operation of a delivery screw device.

[0027]

Consequently, the screw lever 11 of nonrotation is displaced towards the left of drawing 2 with tensile force, and while it displaces the 1st piece member 7 towards the left of drawing 2 in connection with this, it displaces the 2nd piece member 8 towards the method of the right of drawing 2 according to the reaction force of an adjusting nut 14. Therefore, the 1st piece member 7 and the 2nd piece member 8 approach mutually, and press the peripheral face of the inner column 3 by both the inclined planes 7a

and 8a of both the piece members 7 and 8. Thereby, it can carry out with a telescopic bundle.

[0028]

On the other hand, according to an operation of a delivery screw device, if a control lever 15 is rocked to hard flow at the time of telescopic adjustment and an adjusting nut 14 is rotated to hard flow, while the thrust to the method of the right of drawing 2 acts on the screw lever 11 of nonrotation, the reaction force to the left of drawing 2 will act on an adjusting nut 14.

[0029]

Consequently, the screw lever 11 of nonrotation is displaced towards the method of the right of drawing 2 with tensile force, and while it displaces the 1st piece member 7 towards the method of the right of drawing 2 in connection with this, it displaces the 2nd piece member 8 towards the left of drawing 2 according to the reaction force of the inner column 3. Therefore, the 1st piece member 7 and the 2nd piece member 8 estrange mutually, and both the inclined planes 7a and 8a of both the piece members 7 and 8 separate from the peripheral face of the inner column 3. this time -- a compression spring 16 -- alienation of both the piece members 7 and 8 -- actuation is supported. Telescopic discharge can be carried out by this and telescopic adjustment can be carried out.

[0030]

With the gestalt of this operation, as shown in drawing 1 and drawing 3 (a), while having formed the cross section in the triangle (un-circular), as for the cylinder hole 6 of the lock housing section 5, corresponding to this, the cross section is formed in the triangle (un-circular) also for the piece members 7 and 8 of a pair.

[0031]

Moreover, as long as the cross section is un-circular, it may be good, and as shown in drawing 3 (b), the cylinder hole 6 and the piece members 7 and 8 may be squares-like, and may be other configurations.

[0032]

Therefore, even if torque starts the piece members 7 and 8 of a pair at the time of rocking of a control lever 15, rotation of the piece members 7 and 8 of a pair can be prevented certainly, and it can prevent with [ to the inner column 3 of the piece members 7 and 8 at the time of telescopic actuation ] galling.

[0033]

Moreover, the cylinder hole 6 and the piece members 7 and 8 can increase the press side (friction surface) to the inner column 3 by the piece members 7 and 8 from the cross section being un-circular compared with the case of being circular.

[0034]

As shown in drawing 3 (a), namely, the cylinder hole 6 and the piece members 7 and 8 When the cross section is a triangle, as the shaft-orientations die length in contact with the inner column 3 is (D1) and it is shown in drawing 3 (b) When the cross section is a square, as the shaft-orientations die length in contact with the inner column 3 is (D2) and it is shown in drawing 4 , when the cross section is circular Supposing the shaft-orientations die length in contact with the inner column 3 is (d), it is  $D1 > d$  and is  $D2 > d$  so that clearly from these Figs.

[0035]

Therefore, the cylinder hole 6 and the piece members 7 and 8 can increase the press side (friction surface) to the inner column 3 by the piece members 7 and 8 from the cross section being un-circular compared with the case of being circular, and can attain stabilization of the thrust (holding power) by frictional force.

[0036]

In addition, this invention is not limited to the gestalt of operation mentioned above, but is variously deformable. For example, with the gestalt of operation mentioned above, although the telescopic steering column was explained, this invention is applicable also to a tilt telescopic steering column.

[0037]

[Effect of the Invention]

As explained above, according to this invention, the cylinder hole of the lock housing section Even if the piece member of a pair also requires torque for the piece member of a pair at the time of rocking of a

control lever since the cross section is formed in the non-round shape corresponding to this while having formed the cross section in the non-round shape Rotation of the piece member of a pair can be prevented certainly and it can prevent with [ to the inner column of the piece member at the time of telescopic actuation ] galling.

[0038]

Moreover, a cylinder hole and a piece member can increase the press side (friction surface) to the inner column by the piece member from the cross section being un-circular compared with the case of being circular, therefore can attain stabilization of the thrust (holding power) by frictional force.

[Brief Description of the Drawings]

[Drawing 1] It is the side elevation of the flexible type steering column equipment concerning the gestalt of operation of this invention.

[Drawing 2] It is the sectional view which met the II-II line of drawing 1 .

[Drawing 3] (a) is the expansion side elevation of lock housing shown in drawing 1 , and (b) is the expansion side elevation of the lock housing section concerning a modification.

[Drawing 4] It is the expansion side elevation of the lock housing section concerning the former.

[Description of Notations]

- 1 Outer Column
- 2 Bearing Bracket
- 3 Inner Column
- 4 Steering Shaft
- 5 Lock Housing Section
- 6 Cylinder Hole
- 7 1st Piece Member
- 7a The 1st inclined plane
- 8 2nd Piece Member
- 8a The 2nd inclined plane
- 9 Screwwhole
- 10 Through Tube
- 11 Screw Lever
- 11a Screw section
- 11b Reverse screw section
- 12 Locknut
- 13 Flat Side
- 14 Adjusting Nut
- 15 Control Lever
- 16 Compression Spring

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[Translation done.]



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TECHNICAL FIELD

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[Field of the Invention]

This invention expands and contracts the overall length of the steering column which \*\*\*\*(ed) the steering shaft according to an operator's physique and operation posture, and relates to the flexible type steering column equipment which adjusts the car cross-direction location of a steering wheel.

[0002]

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PRIOR ART

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[Description of the Prior Art]

According to an operator's physique and operation posture, the overall length of the steering column which \*\*\*\*(ed) the steering shaft is expanded and contracted, and there is flexible type steering column equipment (the so-called telescopic steering column equipment) which adjusts the car cross-direction location of a steering wheel in the steering system for cars.

[0003]

By the patent reference 1, it has fitted in free [ sliding of the piece member of a pair ] in the cylinder hole which formed the lock housing section in the outer column which \*\*\*\*(ed) the inner column free [ sliding ], and was formed in it at these lock housing circles. While bringing the piece member of these pairs mutually close and pressing an inner column corresponding to rocking of the control lever by the operator, it has the lock device in which make the piece member of a pair estrange mutually and the press to an inner column is canceled.

[0004]

Corresponding to this, that cross section is circularly formed in drawing 4 for the piece member c of the pair to which that cross section fitted into this cylinder hole b free [ sliding ] while the side face of the lock housing section of the flexible type steering column equipment concerning this patent reference 1 is shown and having formed circularly the cylinder hole b formed in the lock housing section a in the case of the patent reference 1.

[0005]

[Patent reference 1]

JP,6-78155,U (utility model registration No. 2588338)

[0006]

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EFFECT OF THE INVENTION

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[Effect of the Invention]

As explained above, according to this invention, the cylinder hole of the lock housing section Even if the piece member of a pair also requires torque for the piece member of a pair at the time of rocking of a control lever since the cross section is formed in the non-round shape corresponding to this while having formed the cross section in the non-round shape Rotation of the piece member of a pair can be prevented certainly and it can prevent with [ to the inner column of the piece member at the time of telescopic actuation ] galling.

[0038]

Moreover, a cylinder hole and a piece member can increase the press side (friction surface) to the inner column by the piece member from the cross section being un-circular compared with the case of being circular, therefore can attain stabilization of the thrust (holding power) by frictional force.

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TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention]

However, in the case of the patent reference 1, at the time of rocking of a control lever, since the cross section of the piece member c of a pair is also circularly formed while having formed circularly the cross section of the cylinder hole b of the lock housing section a, when torque starts the piece member c of a pair, the piece member c of a pair may rotate, respectively.

[0007]

Consequently, if the piece member c is rotating at the time of rocking of a control lever, at the time of telescopic actuation, it will have been said that the piece member c holds on to an inner column.

[0008]

Moreover, if the cross section of the cylinder hole b and the piece member c is circular, in the part where the piece member c presses an inner column, a press side (friction surface) will not be stabilized but it will have been said that the thrust (holding power) by frictional force becomes unstable.

[0009]

It increases the press side to the inner column by the piece member, and aims at offering the flexible type steering column equipment aiming at stabilization of thrust (holding power) while this invention is made in view of a situation which was mentioned above, prevents rotation of a piece member certainly and prevents with [ to the inner column of the piece member at the time of telescopic actuation ] galling.

[0010]

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MEANS

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[Means for Solving the Problem]

In order to attain the above-mentioned purpose, the flexible type steering column equipment concerning this invention fits in the piece member of a pair in the cylinder hole which formed the lock housing section in the outer column which \*\*\*\*(ed) the inner column free [ sliding ], and was formed in it at the lock housing circles concerned, enabling free sliding, and it corresponds to rocking of a control lever. In flexible type steering column equipment equipped with the lock device in which make the piece member of said pair estrange mutually, and the press to said inner column is canceled while bringing the piece member of said pair mutually close and pressing said inner column, While having formed the cross section in the non-round shape, as for the cylinder hole of said lock housing section, the piece member of said pair is also characterized by having formed the cross section in a non-round shape corresponding to this.

[0011]

According to this invention, thus, the cylinder hole of the lock housing section

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the side elevation of the flexible type steering column equipment concerning the gestalt of operation of this invention.

[Drawing 2] It is the sectional view which met the II-II line of drawing 1 .

[Drawing 3] (a) is the expansion side elevation of lock housing shown in drawing 1 , and (b) is the expansion side elevation of the lock housing section concerning a modification.

[Drawing 4] It is the expansion side elevation of the lock housing section concerning the former.

[Description of Notations]

- 1 Outer Column
- 2 Bearing Bracket
- 3 Inner Column
- 4 Steering Shaft
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- 6 Cylinder Hole
- 7 1st Piece Member
- 7a The 1st inclined plane
- 8 2nd Piece Member
- 8a The 2nd inclined plane
- 9 Screw hole
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- 11 Screw Lever
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- 12 Locknut
- 13 Flat Side
- 14 Adjusting Nut
- 15 Control Lever
- 16 Compression Spring

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[Translation done.]

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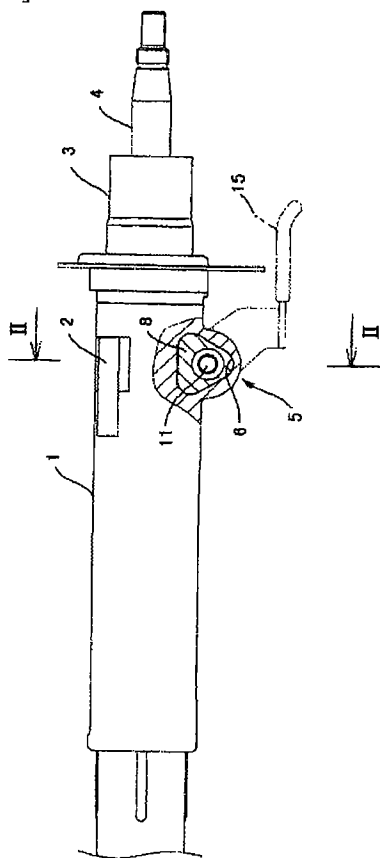
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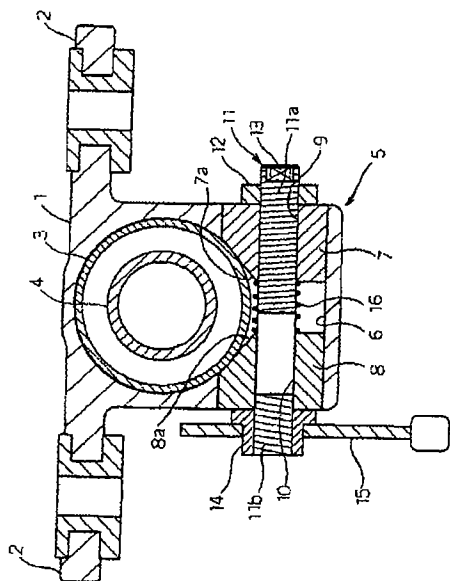
DRAWINGS

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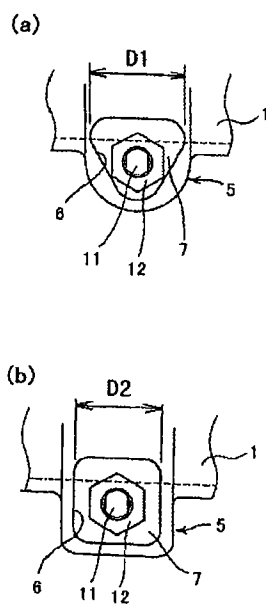
[Drawing 1]



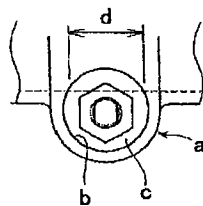
[Drawing 2]



[Drawing 3]





[Drawing 4]

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[Translation done.]

PAT-NO: JP02004155268A  
DOCUMENT-IDENTIFIER: JP 2004155268 A  
TITLE: TELESCOPIC STEERING COLUMN DEVICE  
PUBN-DATE: June 3, 2004

INVENTOR-INFORMATION:

NAME	COUNTRY
YAMAMOTO, HISASHI	N/A

ASSIGNEE-INFORMATION:

NAME	COUNTRY
NSK LTD	N/A

APPL-NO: JP2002321482

APPL-DATE: November 5, 2002

INT-CL (IPC): B62D001/18

ABSTRACT:

PROBLEM TO BE SOLVED: To prevent a piece member from galling to an inner column at a telescoping operation by stopping the rotation of the piece member and to stabilize the pressing power (holding power) by increasing the surface pressed by the piece member toward the inner column.

SOLUTION: A lock housing portion 5 is formed on an outer column 3 through which an inner column 3 is slidably inserted, and a pair of piece members 7 and 8 are fitted slidably into a cylinder hole 6 formed within the lock housing portion 5. There is formed a lock mechanism where the inner column 3 is pressed by making the pair of the piece members 7 and 8 closer to each other while the press toward the inner column 3 is released by separating the members

(19) 日本国特許庁(JP)

(12) 公開特許公報(A)

(11) 特許出願公開番号

特開2004-155268

(P2004-155268A)

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(51) Int.Cl.<sup>7</sup>

B62D 1/18

F1

B62D 1/18

テーマコード (参考)

3D030

審査請求 未請求 請求項の数 1 O L (全 7 頁)

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 (22) 出願日 平成14年11月5日 (2002.11.5)

(71) 出願人 000004204  
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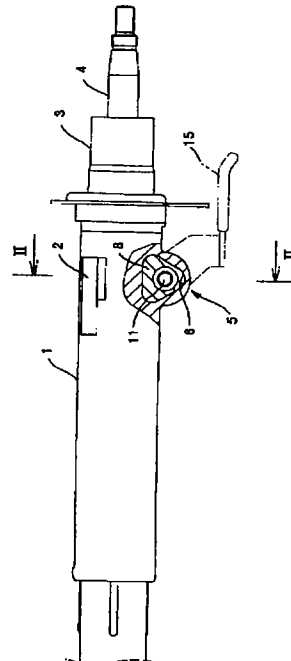
(54) 【発明の名称】 伸縮式ステアリングコラム装置

## (57) 【要約】

【課題】 駒部材の回転を確実に阻止して、テレスコピック操作時における駒部材のインナーコラムへのかじり付きを防止すると共に、駒部材によるインナーコラムへの押圧面を増大して、押圧力（保持力）の安定化を図ること。

【解決手段】 インナーコラム3を摺動自在に通挿したアウターコラム3に、ロックハウジング部5を形成し、このロックハウジング部5内に形成したシリンダー孔6内に、一対の駒部材7、8が摺動自在に嵌合してある。運転者による操作レバー15の揺動に対応して、これら一対の駒部材7、8を相互に近付けてインナーコラム3を押圧する一方、一対の駒部材7、8を相互に離間させてインナーコラム3への押圧を解除するロック機構を備えている。ロックハウジング部5のシリンダー孔6は、その断面が三角形（非円形）に形成してあると共に、一対の駒部材7、8も、これに対応して、その断面が三角形（非円形）に形成してある。

【選択図】 図1



## 【特許請求の範囲】

## 【請求項 1】

インナーコラムを摺動自在に通挿したアウターコラムに、ロックハウジング部を形成し、当該ロックハウジング部内に形成したシリンダー孔内に、一対の駒部材を摺動自在に嵌合し、操作レバーの揺動に対応して、前記一対の駒部材を相互に近付けて前記インナーコラムを押圧する一方、前記一対の駒部材を相互に離間させて前記インナーコラムへの押圧を解除するロック機構を備えた伸縮式ステアリングコラム装置において、前記ロックハウジング部のシリンダー孔は、その断面が非円形に形成してあると共に、前記一対の駒部材も、これに対応して、その断面が非円形に形成してあることを特徴とする伸縮式ステアリングコラム装置。

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## 【発明の詳細な説明】

## 【0001】

## 【発明の属する技術分野】

本発明は、運転者の体格や運転姿勢に応じて、ステアリングシャフトを通挿したステアリングコラムの全長を伸縮して、ステアリングホイールの車両前後方向位置を調整する伸縮式ステアリングコラム装置に関する。

## 【0002】

## 【従来の技術】

車両用ステアリング装置において、運転者の体格や運転姿勢に応じて、ステアリングシャフトを通挿したステアリングコラムの全長を伸縮して、ステアリングホイールの車両前後方向位置を調整する伸縮式ステアリングコラム装置（所謂、テレスコピック式ステアリングコラム装置）がある。

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## 【0003】

特許文献 1 では、インナーコラムを摺動自在に通挿したアウターコラムに、ロックハウジング部を形成し、このロックハウジング部内に形成したシリンダー孔内に、一対の駒部材が摺動自在に嵌合してある。運転者による操作レバーの揺動に対応して、これら一対の駒部材を相互に近付けてインナーコラムを押圧する一方、一対の駒部材を相互に離間させてインナーコラムへの押圧を解除するロック機構を備えている。

## 【0004】

図 4 には、この特許文献 1 に係る伸縮式ステアリングコラム装置のロックハウジング部の側面が示してあり、特許文献 1 の場合には、ロックハウジング部 a に形成したシリンダー孔 b は、その断面が円形に形成してあると共に、このシリンダー孔 b に摺動自在に嵌合した一対の駒部材 c も、これに対応して、その断面が円形に形成してある。

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## 【0005】

## 【特許文献 1】

実開平 6-78155 号公報（実用新案登録第 2588338 号）

## 【0006】

## 【発明が解決しようとする課題】

しかしながら、特許文献 1 の場合には、ロックハウジング部 a のシリンダー孔 b の断面が円形に形成してあると共に、一対の駒部材 c の断面も円形に形成してあることから、操作レバーの揺動時には、一対の駒部材 c にトルクがかかると、一対の駒部材 c が夫々回転してしまうことがある。

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## 【0007】

その結果、操作レバーの揺動時に駒部材 c が回転していると、テレスコピック操作時には、駒部材 c がインナーコラムにかじり付くといったことがある。

## 【0008】

また、シリンダー孔 b と駒部材 c は、その断面が円形であると、駒部材 c がインナーコラムを押圧する箇所では、押圧面（摩擦面）が安定せず、摩擦力による押圧力（保持力）が不安定になるといったことがある。

## 【0009】

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本発明は、上述したような事情に鑑みてなされたものであって、駒部材の回転を確実に阻止して、テレスコピック操作時における駒部材のインナーコラムへのかじり付きを防止すると共に、駒部材によるインナーコラムへの押圧面を増大して、押圧力（保持力）の安定化を図った伸縮式ステアリングコラム装置を提供することを目的とする。

【0010】

【課題を解決するための手段】

上記の目的を達成するため、本発明に係る伸縮式ステアリングコラム装置は、インナーコラムを摺動自在に通挿したアウターコラムに、ロックハウジング部を形成し、当該ロックハウジング部内に形成したシリンダー孔内に、一对の駒部材を摺動自在に嵌合し、操作レバーの揺動に対応して、前記一对の駒部材を相互に近付けて前記インナーコラムを押圧する一方、前記一对の駒部材を相互に離間させて前記インナーコラムへの押圧を解除するロック機構を備えた伸縮式ステアリングコラム装置において、

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前記ロックハウジング部のシリンダー孔は、その断面が非円形に形成してあると共に、前記一对の駒部材も、これに対応して、その断面が非円形に形成してあることを特徴とする。

【0011】

このように、本発明によれば、ロックハウジング部のシリンダー孔は、その断面が非円形に形成してあると共に、一对の駒部材も、これに対応して、その断面が非円形に形成してあることから、操作レバーの揺動時に、一对の駒部材にトルクがかかったとしても、一对の駒部材の回転を確実に阻止することができ、テレスコピック操作時における駒部材のインナーコラムへのかじり付きを防止することができる。

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【0012】

また、シリンダー孔と駒部材は、その断面が非円形であることから、円形の場合に比べて、駒部材によるインナーコラムへの押圧面（摩擦面）を増大することができ、従って、摩擦力による押圧力（保持力）の安定化を図ることができる。

【0013】

【発明の実施の形態】

以下、本発明の実施の形態に係る伸縮式ステアリングコラム装置を図面を参照しつつ説明する。

【0014】

図1は、本発明の実施の形態に係る伸縮式ステアリングコラム装置の側面図である。図2は、図1のI I-I I線に沿った断面図である。図3（a）は、図1に示したロックハウジングの拡大側面図であり、（b）は、変形例に係るロックハウジング部の拡大側面図である。

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【0015】

図1及び図2に示すように、アウターコラム1は、アルミニウム材のダイキャスト成形或は合成樹脂の射出成形等により、軸方向に長い管状に形成してある。このアウターコラム1は、その両側に一体成形により突出した支持ブラケット2により、ダッシュボードの下方等に支持してある。

【0016】

アウターコラム1の内側には、軸方向に長い管状に形成したインナーコラム3が軸方向に摺動自在に挿入してある。このインナーコラム3の内側には、伸縮自在なステアリングシャフト4が回転自在に支持してある。

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【0017】

図2に示すように、支持ブラケット2の下側部分には、ロックハウジング部5が一体成形により形成してある。このロックハウジング部5には、ロックハウジング部5を車幅方向に貫通するシリンダー孔6が形成してある。

【0018】

このシリンダー孔6の片半部（図2の右半部）には、第1駒部材7が摺動自在に挿入してある。第1駒部材7の中央寄りの上部には、第1傾斜面7aが形成してあり、この第1傾

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斜面 7 a は、インナーコラム 3 の外周面を押圧するようになっている。

【0019】

また、シリンダー孔 6 の他半部（図 2 の左半部）には、第 2 駒部材 8 が摺動自在に挿入してある。第 2 駒部材 8 の中央よりの上部には、第 2 傾斜面 8 a が形成してあり、この第 2 傾斜面 8 a は、インナーコラム 3 の外周面を押圧するようになっている。

【0020】

なお、第 1 及び第 2 傾斜面 7 a, 8 a は、平面でもよく、インナーコラム 3 の外周面に対応した曲面形状であってもよい。

【0021】

次に、これら第 1 及び第 2 駒部材 7, 8 のロック機構は、以下のように構成してある。第 1 駒部材 7 には、雌ネジのネジ孔 9 が形成してある。第 2 駒部材 8 には、ネジ孔 9 と同心に貫通孔 10 が形成してある。第 1 駒部材 7 のネジ孔 9 と、第 2 駒部材 8 の貫通孔 10 とには、ネジ杆 11 が挿入してある。

【0022】

ネジ杆 11 は、一端側に、ネジ孔 9 に螺合する雄ネジのネジ部 11 a を有すると共に、他端側には、逆雄ネジの逆ネジ部 11 b を有している。尚、この逆ネジ部 11 b は、二条ネジ等、ピッチの粗いネジとしている。

【0023】

なお、ネジ杆 11 の一端側で、第 1 駒部材 7 の外端面から突出した部分には、ロックナット 12 が螺合してある。このロックナット 12 は、第 1 駒部材 7 の外端面に緊締して、ネジ杆 11 を非回転に維持している。尚、ネジ杆 11 の一端部外周面には、互いに平行な 1 対の平坦面 13 が形成してある。

【0024】

ネジ杆 11 の他端側で、第 2 駒部材 8 の外端面から突出した逆ネジ部 11 b には、調整ナット 14 が螺合してある。この調整ナット 14 に、操作レバー 15 の基端部が溶接等により結合固定してある。

【0025】

更に、第 1 及び第 2 駒部材 7, 8 同士の間には、圧縮バネ 16 が挟持してある。この圧縮バネ 16 の付勢力により、テレスコピック調整時、両駒部材 7, 8 同士を確実に離間させるようになっている。なお、圧縮バネ 16 は、必要に応じて設ければよく、必ずしも必須ではない。

【0026】

このように構成した伸縮式ステアリングコラム装置では、テレスコピック締付時、操作レバー 15 を一方向に揺動して、調整ナット 14 を一方向に回転すると、調整ナット 14 は、非回転のネジ杆 11 の逆ネジ部 11 b に螺合してあることから、送りネジ機構の作用により、非回転のネジ杆 11 には、図 2 の左方への引張力が作用する一方、調整ナット 14 には、図 2 の右方への反力が作用する。

【0027】

その結果、非回転のネジ杆 11 は、引張力により図 2 の左方に向けて変位し、これに伴って、第 1 駒部材 7 は、図 2 の左方に向けて変位する一方、第 2 駒部材 8 は、調整ナット 14 の反力により図 2 の右方に向けて変位する。従って、第 1 駒部材 7 と、第 2 駒部材 8 とが相互に近付いて、両駒部材 7, 8 の両傾斜面 7 a, 8 a によりインナーコラム 3 の外周面を押圧する。これにより、テレスコピック締付することができる。

【0028】

一方、テレスコピック調整時には、操作レバー 15 を逆方向に揺動して、調整ナット 14 を逆方向に回転すると、送りネジ機構の作用により、非回転のネジ杆 11 には、図 2 の右方への押圧力が作用する一方、調整ナット 14 には、図 2 の左方への反力が作用する。

【0029】

その結果、非回転のネジ杆 11 は、引張力により図 2 の右方に向けて変位し、これに伴って、第 1 駒部材 7 は、図 2 の右方に向けて変位する一方、第 2 駒部材 8 は、インナーコラ

ム 3 の反力により図 2 の左方に向けて変位する。従って、第 1 駒部材 7 と、第 2 駒部材 8 とが相互に離間して、両駒部材 7, 8 の両傾斜面 7 a, 8 a がインナーコラム 3 の外周面から離れる。この時、圧縮バネ 1 6 が両駒部材 7, 8 の離間動作を助成する。これにより、テレスコピック解除して、テレスコピック調整することができる。

【0030】

本実施の形態では、図 1 及び図 3 (a) に示すように、ロックハウジング部 5 のシリンダー孔 6 は、その断面が三角形（非円形）に形成してあると共に、一对の駒部材 7, 8 も、これに対応して、その断面が三角形（非円形）に形成してある。

【0031】

また、シリンダー孔 6 と駒部材 7, 8 は、その断面が非円形であればよく、図 3 (b) に示すように、四角形状であってもよく、その他の形状であってもよい。

【0032】

従って、操作レバー 1 5 の揺動時に、一对の駒部材 7, 8 にトルクがかかったとしても、一对の駒部材 7, 8 の回転を確実に阻止することができ、テレスコピック操作時における駒部材 7, 8 のインナーコラム 3 へのかじり付きを防止することができる。

【0033】

また、シリンダー孔 6 と駒部材 7, 8 は、その断面が非円形であることから、円形の場合に比べて、駒部材 7, 8 によるインナーコラム 3 への押圧面（摩擦面）を増大することができる。

【0034】

すなわち、図 3 (a) に示すように、シリンダー孔 6 と駒部材 7, 8 は、その断面が三角形である場合、インナーコラム 3 に接触する軸方向長さが (D 1) であり、図 3 (b) に示すように、その断面が四角形である場合、インナーコラム 3 に接触する軸方向長さが (D 2) であり、図 4 に示すように、その断面が円形である場合には、インナーコラム 3 に接触する軸方向長さが (d) であるとする、これら図から明らかなように、 $D 1 > d$  であり、 $D 2 > d$  である。

【0035】

従って、シリンダー孔 6 と駒部材 7, 8 は、その断面が非円形であることから、円形の場合に比べて、駒部材 7, 8 によるインナーコラム 3 への押圧面（摩擦面）を増大することができ、摩擦力による押圧力（保持力）の安定化を図ることができる。

【0036】

なお、本発明は、上述した実施の形態に限定されず、種々変形可能である。例えば、上述した実施の形態では、テレスコピック式ステアリングコラムについて説明したが、チルト・テレスコピック式ステアリングコラムにも、本発明を適用することができる。

【0037】

【発明の効果】

以上説明したように、本発明によれば、ロックハウジング部のシリンダー孔は、その断面が非円形に形成してあると共に、一对の駒部材も、これに対応して、その断面が非円形に形成してあることから、操作レバーの揺動時に、一对の駒部材にトルクがかかったとしても、一对の駒部材の回転を確実に阻止することができ、テレスコピック操作時における駒部材のインナーコラムへのかじり付きを防止することができる。

【0038】

また、シリンダー孔と駒部材は、その断面が非円形であることから、円形の場合に比べて、駒部材によるインナーコラムへの押圧面（摩擦面）を増大することができ、従って、摩擦力による押圧力（保持力）の安定化を図ることができる。

【図面の簡単な説明】

【図 1】本発明の実施の形態に係る伸縮式ステアリングコラム装置の側面図である。

【図 2】図 1 の I I - I I 線に沿った断面図である。

【図 3】(a) は、図 1 に示したロックハウジングの拡大側面図であり、(b) は、変形例に係るロックハウジング部の拡大側面図である。

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【図 4】従来に係るロックハウジング部の拡大側面図である。

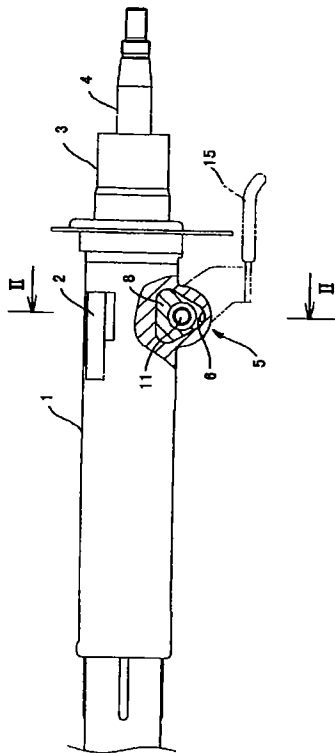
【符号の説明】

- 1    アウターコラム
- 2    支持ブラケット
- 3    インナーコラム
- 4    ステアリングシャフト
- 5    ロックハウジング部
- 6    シリンダー孔
- 7    第 1 駒部材
- 7 a   第 1 傾斜面
- 8    第 2 駒部材
- 8 a   第 2 傾斜面
- 9    ネジ孔
- 10   貫通孔
- 11   ネジ杆
- 11 a   ネジ部
- 11 b   逆ネジ部
- 12   ロックナット
- 13   平坦面
- 14   調整ナット
- 15   操作レバー
- 16   圧縮バネ

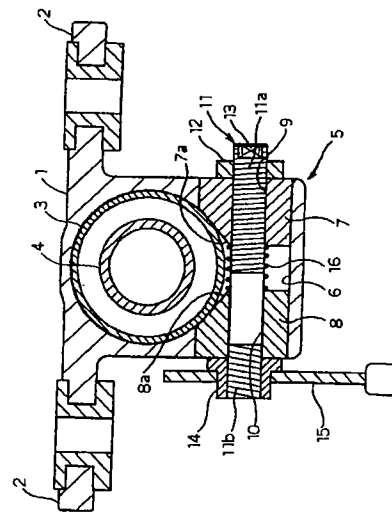
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【図 1】



【図 2】





【図 3】

【図 4】

